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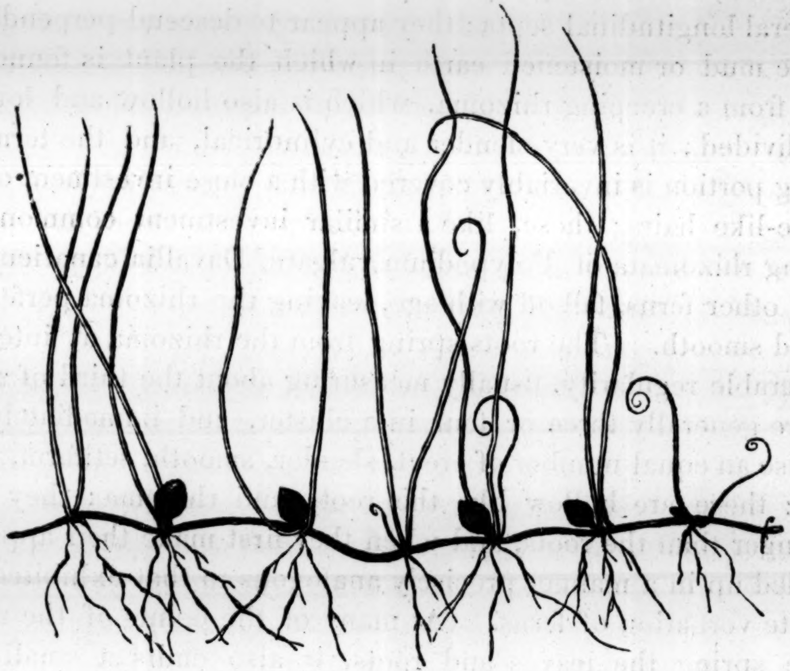
ART. LXIII.—*A History of the British Lycopodia and allied Genera.*

By EDWARD NEWMAN. (Continued from page 160).



PILL-WORT OR PEPPER-GRASS.

PILULARIA GLOBULIFERA of Authors.

THE Pill-wort or Pepper-grass seems pretty generally, though not plentifully, distributed over the United Kingdom. It is found on the extreme margins of ponds, or on swampy ground, submerged during the winter and more or less exposed during the summer. It is sometimes so abundant as to form a dense and almost inextricably matted covering to the ground. In no instance that has come to my knowledge has it been found in deep water, or in a state of constant submersion.

The figures of this plant are generally characteristic, but nearly all of them err in not representing it sufficiently slender; the best I have seen are those by Bernard de Jussieu, published in the 'Mémoires de l'Académie Royale des Sciences,'* and by Mr. Valentine, in the 'Transactions of the Linnean Society.'† Both these authors have given full and interesting details of its history, and seem so completely to have preoccupied the ground as to leave little or nothing for me to add. An abstract of Mr. Valentine's paper has already appeared in 'The Phytologist' (Phytol. 55), and a second detail of his observations would not be justifiable.

The roots are generally two or three inches in length, very flexible, slender, and but slightly branched; they are hollow, and divided by several longitudinal septa; they appear to descend perpendicularly into the mud or moistened earth in which the plant is found: they spring from a creeping rhizoma, which is also hollow and longitudinally divided; it is very slender and cylindrical, and the terminal or growing portion is invariably covered with a close investment of scales or scale-like hairs; these, like a similar investment common to the creeping rhizomata of Polypodium vulgare, Davallia canariensis, and several other ferns, fall off with age, leaving the rhizoma perfectly naked and smooth. The roots spring from the rhizoma at intervals of considerable regularity, usually measuring about the third of an inch: they are generally three or four in a cluster, and immediately above them rise an equal number of erect, slender, smooth, setiform, pointed leaves: these are hollow like the roots and rhizoma; they are rather longer than the roots, and when they first make their appearance are rolled up in a manner precisely analogous to that exhibited in the circinate vernation of ferns. At many of the points of the rhizoma whence spring the leaves and roots, it also emits a small lateral branch, which bears leaves and roots at intervals like the parent rhizoma; and when this, in the course of nature, decays, these lateral branches continue vigorous, and become the nuclei whence future plants originate. The lateral branches occur with great regularity alternately on the right and left of the parent rhizoma; in proportion to their distance from the terminal point of the rhizoma these lateral branches increase in length, and the angles at which they join it become more and more obtuse.

The capsule is placed on a short stalk in the axil of the leaves: when full grown it occasionally attains the size of an ordinary pepper-corn, and is nearly spherical, but slightly elongated at its apex; it is closely covered with a dense investment of hair. When mature* it opens at the apex, dividing longitudinally into four parts, each of which continues attached by its inferior extremity to the common footstalk.

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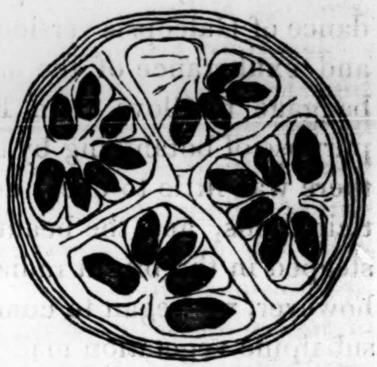
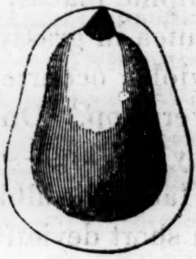
* 1739, p. 256, tab. xi.

† Trans. Linn. Soc. xviii. 483.

Each of these four parts is hollow, and its cavity, which retains the figure of a quarter sphere, is filled with an hermaphrodite flower composed of stamens and pistils arranged on a common placenta. This placenta is a membranous band attached to the interior spherical portion of the membrane which invests the capsule. The pistils, according to Jussieu, are ranged on the inferior part of the placenta, and consequently occupy the lower portion of the common receptacle, as exhibited in the annexed cut, which is copied, with some slight alterations, from Mr. Valentine's figure.† The shaded bodies represent the so-called pistils of Jussieu, and one of these detached is represented below, with its gelatinous covering, the result of immersion in water. The upper part of each cell is occupied by smaller granules, which are described as stamens, but this appears a somewhat vague conjecture, their office as such never having been clearly proved. Whatever may be the correct designation of the larger granules in their earlier state, it is quite certain that they ultimately become true seeds; for both the authors quoted have succeeded in tracing their germination, and have recorded their observations on the subject with a close correspondence which mutually proves their accuracy and precision; the improvement in the structure of microscopes and the more artistical drawing of Mr. Valentine giving however a decided superiority to his illustrations. These observations are made on the assumption that Mr. Valentine was entirely unacquainted with the contents of M. Jussieu's admirable essay, which, from an observation in his introductory remarks, I most readily believe.





According to Jussieu the seeds of Pilularia are to be found in the months of September and October, floating on the surface of the water and germinating in that situation.

EDWARD NEWMAN.

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* This description is quoted nearly verbatim from Jussieu, l. c.

† 'Trans. Linn. Soc.' xviii. tab. 35, fig. 30.

Art. LXIV.—*Sketch of an Excursion to the Clova Mountains, in July and August*, 1840.* By William Gardiner, Esq., Jun.

In company with a botanical friend, I left Dundee on the morning of the 27th of July by the first railway train for Glammis, where we arrived about half past 10 o'clock. Between that place and Kirriemuir nothing of consequence attracted our attention, except abundance of Galeopsis versicolor in the cornfields, and the unusual beauty and exuberance of the more common flowers. We despatched our baggage to Clova from Kirriemuir, and walked on ourselves for the purpose of botanizing by the way. From the latter place to Cortachy there was little to cheer us save our own glad thoughts and joyful anticipations, and the beauty of the scenery through which we passed, steeped in the bright radiance of a summer sun. Beyond Cortachy, however, we began to come among the mountains, and some traces of subalpine vegetation made their appearance. Agrostis vulgaris var. γ. pumila was our first acquisition, and soon after we came upon Habenaria bifolia and Narthecium ossifragum, both very common to subalpine places, such as the Sidlaw Hills. We next met with Viola lutea in grassy places by the waysides; and this beautiful mountain violet occurred more or less profusely all the way up the glen to its very top. On little knolls beyond a miserable public-house dignified by the high-sounding appellation of the Red Lion Inn, we met with Habenaria albida: and being now at the foot of the mountains we made a short deviation from the road, and gathered from a large detached rock Alectoria jubata var. β. chalybeiformis and Andræa rupestris. By the sides of rills abundance of Saxifraga stellaris and aizoides showed themselves, and on the heaths we picked a single stalk of Erica Tetralix with white flowers, and one or two of the pink-flowered variety of E. cinerea. Farther up the Glen we found Meum athamanticum in abundance by the waysides, and by the margin of the Esk grew Carex aquatilis in great luxuriance, along with Galium boreale, and here and there a specimen of Cnicus heterophyllus. Some little distance beyond the "smithy" Pyrola media occurred, though sparingly and past its prime, as was Polygonum viviparum with which it was associated. Alchemilla alpina now showed itself, and was our constant companion wherever we went, during our stay at Clova.

Pretty well loaded for the first day, we reached the hamlet of Clova in time to enjoy the glorious spectacle of an alpine sun-set, and soon after did complete justice to the good cheer prepared for us by Mary Findlay.

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* Read before the Botanical Society of Edinburgh, December 10, 1840.

We next morning went up the mountains to Loch Brandy, for the twofold purpose of enjoying the sight of its wild and picturesque scenery, and searching out the botanical treasures of its surrounding rocks. On the marshy banks of the stream by which we ascended we found Veronica serpyllifolia var. β. alpina, Epilobium alpinum and alsinifolium, and great profusion of Saxifraga aizoides and S. stellaris. These plants we afterwards found more or less abundant by the sides of all the streams in the district which we examined. The first view we had of the Loch was from an unfavourable position, and we felt disappointed; but as we advanced up the steep hill on the left hand side, our admiration increased at every step, till at length, having gained the summit, and descended a few yards among the overhanging cliffs, the whole grandeur of the scene burst upon our enraptured gaze. Far below lay the dark lake, slumbering in its mountain solitude, while around it rose, guardian-like, the mighty cliffs, sunning their rugged brows in the sweet light of the morning, and looking proud in their magnificence. Quietness brooded in the still air, and no sound was heard to break the awful tranquillity, save when the distant bleat of a sheep fell upon the startled ear, or the plaintive tones of my companion's flute awoke the echoes of the wild rocks. We feasted ourselves for some time on the sublimity of this alpine picture, and then turned our attention to the gems of beauty which the fair hand of Flora had profusely scattered around. We here gathered Azalea procumbens, Gnaphalium supinum, Rubus Chamæmorus, Lycopodium Selago and alpinum, Polytrichum alpinum, Conostomum boreale, Splachnum mnioides, and, at the risk of breaking our necks, Cerastium alpinum and Saxifraga hypnoides. At the head of the Loch we descended by a terrific water-course to its margin, collecting in our way Saxifraga oppositifolia, Salix herbacea, Hieracium alpinum, Rhodiola rosea, Weissia acuta, Didymodon capillaceus and rigidulus, the latter but sparingly; and among the rocks on the banks of the Loch there was an exuberance of Arbutus Uva-ursi and Vaccinium Vitis-idæa, but neither of them in flower.

We went round about the small lochs looking for Isoetes lacustris, and picked up a specimen or two, but saw no appearance of it in a growing state, and did not think of wading in search of it, otherwise we should have reaped a rich harvest, as it was found, along with Lobelia Dortmanna, in the greatest abundance, by my friends Messrs. Croall and Kerr, in September. Among the rocks, just where the southmost stream issues from the Loch, we met with the elegant Hypnum Silesianum. A little farther down we came upon some fine tufts of Aspidium Lonchitis, and before reaching the hamlet plenty of Polypodium Phegopteris.

Our next excursion was to Glen Dole, and a perilous one it was, partly owing to our inexperience of the place. On leaving the hamlet we picked a few specimens of Carex ovalis; and at Bradooney we spent a considerable time searching for Oxytropis campestris among "rocks facing the south," but found only Habenaria viridis and Marchantia hemisphærica for our trouble. Oxyria reniformis was plentiful on the banks of the Esk near Acharne, but we found it in a much finer state on a small island in the Dole, near where it is joined by Kilbo Burn. On this island there was also abundance of Valeriana officinalis, Solidago Virgaurea and Festuca ovina var. ε. vivipara: the latter plant was plentiful in many places, but nowhere finer than here. We went up Glen Phee a considerable distance, but finding nothing except Juniperus communis and Arbutus Uva-ursi, retraced our steps and ascended the face of Craig Rennet by an untrodden path, so precarious that the very recollection of it almost curdles the blood in one's veins. Our toil was rewarded, however, with fine specimens of Silene acaulis, Andræa alpina, Conostomum boreale, Weissia acuta, Jungermannia nemorosa, var. β. purpurascens, &c.; and on the summit there was abundance of Cetraria Islandica. This interesting lichen, which we had hitherto looked upon as a rarity, was plentiful on all the Clova mountains which we visited, and in fine condition, though barren. Proceeding along the ridge towards Craig Maid, we found in boggy places Vaccinium uliginosum, and several beautiful patches of Splachnum sphæricum; and on the summit of Craig Maid Luzula spicata. We had intended to have gone to the White Water and come round by the head of Glen Dole, but time forbade, as the day was wearing to a close, and we therefore determined to attempt descending into Glen Dole. The ascent of Craig Rennet had inured us to danger, and we did not hesitate to choose for our path a wild and dismal-looking water-course that led us down the very face of Craig Maid. By caution and perseverance we accomplished our task, and reaped in our way a rich botanical harvest. Among our acquisitions were the beautiful Lycopodium annotinum, Hieracium alpinum and Halleri, Cnicus heterophyllus, Aspidium Lonchitis, Rhodiola rosea in great perfection, and various other species which we had previously met with.

During our stay at Clova we made two other trips to Glen Dole.

The first of these was on the 31st of July. We ascended Craig Mellon from Acharne, collecting in our way fine specimens of Gnaphalium supinum, Saxifraga oppositifolia and Lycopodium selaginoides, and on the stones at its summit Lecanora ventosa. Proceeding along the ridge we picked specimens of Bryum alpinum and a few Jungermanniæ, and came upon the Dole at its junction with the White Water. About the falls we gathered Rhodiola rosea, Lycopodium annotinum, Cnicus heterophyllus and a variety with deeply cut leaves, Thalictrum alpinum, Hieracium pulmonarium, Carex curta, fulva, sylvatica, binervis and several others, Salix alba and arenaria, Pyrus aucuparia, Veronica alpina and Phleum alpinum. The two latter plants occurred, though sparingly, both above and below the falls. In the crevices of the rocks below we found Bryum elongatum, crudum and ventricosum, and a slender state of Trichostomum aciculare. On the banks of the White Water above the falls we met with Juncus triglumis, and proceeding round by the shieling at the head of Glen Dole we collected Melampyrum pratense, Cornus suecica, and Rubus Chamæmorus in flower and fruit.

On our third visit, August 5th, we examined some of the rocks a short distance below the falls of the White Water, and had the good fortune to discover the beautiful Hypnum Crista-castrensis in fructification, and the rare Dicranum polycarpon; and on the moist precipices almost within reach of the spray, a few specimens of Erigeron alpinus and Asplenium viride. Jungermannia Blasia occurred in crevices of rocks by the side of the Dole. At the head of Glen Dole, after an eager search, we came upon the bog where Carex rariflora grows, and found it in the greatest profusion. Before we had satisfied ourselves with the much-prized rarity, the evening mist had gathered around us, and so densely, that we could not see more than a few feet beyond us. Had we not taken our bearings well we should have been truly bewildered, and run the risk of ending our career at the bottom of the neighbouring precipices; but by the aid of our compass we managed to reach the shieling, and the shepherd carefully put us on "Jock's road," which, though not a very "redd" road, led us safely down the glen.

We spent a day on Carlowie hill gathering lichens, for few flowering plants of interest were there, except Arbutus Uva-ursi. We picked from the rocks and stones numerous specimens of Gyrophora cylindrica, proboscidea and polyphylla, Cornicularia tristis and lanata, Stereocaulon paschale, Sphærophoron coralloides and one tuft of var. β. (the Sph. fragile of Acharius) in fructification. These lichens were also abundant on the hill above the hamlet of Clova, as well as several others, particularly Lecanora tartarea and Parmelia omphalodes. On the "Greenhill," south of Loch Brandy, we found Spergula subulata and Azalea procumbens.

To the Bassies mountain we made two visits, and found several good things. Azalea procumbens was plentiful on its summit, associated with Salix herbacea and Juncus trifidus: the specimens of the latter plant gathered here, however, were stunted and insignificant in their appearance compared with the fine tufts which we culled from the fissures of the rocks about half way down. Carex rigida was frequent; Alchemilla alpina literally mantled the mountain with its silvery foliage; and we noticed Sibbaldia procumbens and Tofieldia palustris, but without flowers. On the summit there was a profusion of Cetraria nivalis, and we also gathered Solorina crocea, Cornicularia aculeata in fruit, Lecidea fusco-lutea and Splachnum sphæricum; and in a bog was Polytrichum juniperinum, var. β. gracilius (the P. strictum of Menzies). Between Bassies and Scorie there was plenty of Conostomum boreale and Polytrichum hercynicum, together with Dicranum Starkii, subulata and virens. Polytrichum alpinum was in abundance everywhere on the mountains at a good elevation. By the side of a watercouse in descending from the Bassies we met with a specimen or two of Alopecurus alpinus, Hieracium alpinum and Halleri; but the most interesting of our acquisitions on the Bassies was Jungermannia ciliaris *with calyces*, which are of exceedingly rare occurrence. The calyx-bearing plants were very small and perfectly procumbent, growing among tufts of Dicranum scoparium. We also found on this mountain beautiful specimens of Tetraphis pellucida in fruit.

On the banks of the Esk about Clova there was plenty of Carex ampullacea and Geranium sylvaticum, with Galium palustre var. β. Witheringii and Cnicus heterophyllus; and we also found Rumex aquaticus and Rubus suberectus. The latter plant occurred in many places in the valleys as well as on the mountains.

On our return down the glen we met with nothing that we had not previously seen in the district, except Triodia decumbens, which grew on small hillocks by the waysides.

This being our first visit to these mountains the ground was entirely new to us, and particular localities quite unknown, so that we were unsuccessful in obtaining many of the rarities which are there to be found. Professor Balfour, who is intimately acquainted with the district, procured, just before we left, Dryas octopetala, Veronica saxatilis, Linnæa borealis, Malaxis paludosa, Sonchus alpinus and Salix lanata. From my second visit, which I hope to be able to make this summer, better results may reasonably be anticipated.

William Gardiner, Jun.

Dundee, March 4, 1842.

Art. LXV. — *Notes on Arenaria rubra, marina, and media.*

By Samuel Gibson, Esq.

Hebden Bridge, May 5, 1842.

Sir,

A difference of opinion having long existed as to whether *Arenaria rubra* and *marina* are two distinct plants, or only varieties of one species ; in order to set this question at rest in my own mind, I procured specimens of the two plants from every locality where I could possibly get them from, either by sending to my friends or by collecting them myself. After collecting what specimens I could get, I gave them a careful examination, and am now of opinion that *Arenaria rubra* and *marina*, and the *media* of Linnæus, all three possess permanent characters sufficient to keep them distinct as species. *Arenaria marina* and *media* I have found plentifully growing together, each retaining its characteristic marks; the *seeds* of *media* being bordered with a striated membrane, while those of *marina* are destitute of such a border.

What Sir W. J. Hooker's *Arenaria rubra* may be I know not. The calyx is said to be nerveless; such a character I have not been able to find in any of the three forms. It may require further investigation in order to decide whether or not Sir W. J. Hooker's plant be something very different from anything I have ever seen; but what specimens I possess will answer to the following descriptions.

1. *Arenaria rubra*, (Red Sandwort). *Stems* procumbent, smooth, except near the flowers, where they have a few glandular hairs such as cover the calyx and flower-stalks: *leaves* linear, flat, terminating in a small bristle: segments of the *calyx* ovate, acute, *three-nerved*, the two lateral nerves very short, the middle one as long as the segment: *seeds* small, somewhat pyriform, thick in proportion to their breadth, rough all over with raised points.

My specimens are from Huddersfield, Halifax, &c.

β. *brevifolia*, mihi. This variety differs from the more common state of *Arenaria rubra* in the internodes of the stems and the leaves being only about half the length, and in the flowers being more numerous, &c.

Common in the neighbourhood of Manchester, as at Kersal Moor, &c.

2. *Arenaria marina*, (Marine Sandwort). *Stems* procumbent, smooth: *leaves* as long as the internodes, blunt at the point, semicylindrical: *capsule* as long as the calyx: segments of the *calyx* ovate, three-ribbed, ribs pellucid: *seeds* ear-shaped, thickened and rough on their edges, depressed and nearly smooth in the middle, nearly twice the size of those of *Arenaria rubra.*

This appears to be somewhat rare; some of my specimens are from the Yorkshire coast at Bridlington and Scarborough, and others from near Liverpool.

β. *hirsuta*, mihi. This differs from the above in the stems being wholly covered with glandular hairs.

My specimens are from Newlyn Cliff, near Penzance, Cornwall.

3. *Arenaria media*, (Smooth-seeded Sandwort). *Stems* procumbent, smooth: *leaves* as long as the internodes, blunt at the point, semicylindrical, fleshy, flaccid when dry: *capsule* twice the length of the calyx: segments of the *calyx* obovate, three-nerved, nerves pellucid: *seeds* ear-shaped, smooth, much larger than those of *Arenaria marina*, with a broad, white, striated border.

This appears to be the most common of the three plants, as I have specimens from the following localities, viz., North shore, Liverpool, Southport &c., Lancashire; Wallazey pool, Cheshire; &c. I also have it from two three localities in Ireland, and others from Scotland.

If you should think the above remarks worthy a place in your periodical, they are at your service.

Yours, &c.
Saml. Gibson.

To the Editor of 'The Phytologist.'

Art. LXVI.—*On the escape of Fluid from the Apex of the Leaf of Richardia æthiopica*, Kunth, (*Calla æthiopica*, Linn.) By Edwin J. Quekett, Esq., F.L.S., B.S., &c.

My attention having been directed to this fact by my friend Mr. Ward, and having a large case constructed after his plan for the growth of plants, I placed within it, in the summer, with numerous others, a healthy specimen of Richardia æthiopica, which was kept well supplied with water. It was soon perceived that the dripping from the apex of the leaf had commenced, and it continued as long as the weather was warm.

On experimenting on this plant it was found that the greatest number of drops in a given time were to be obtained soon after the sun had ceased to shine on the plant, which was at mid-day; the number never exceeded one in a minute, and generally they were not so frequent as this. I was anxious to collect some of the fluid in order to analyze it, and suspended a small vessel near to the apex; during the day and night I could thus obtain two or three drams from one leaf. It was perfectly bright in colour and tasteless, and on applying tests which usually exhibit impurities in water no reaction could be obtained. The plant was sometimes watered with a decoction of logwood, yet no indication of its presence could be detected in the colour of the fluid, or by the salts of iron; in fact it appeared to be pure water, notwithstanding that lime and other matters must have been present in the water applied to the roots.

Reflecting on the purity of the fluid, and how the plant could so effectually separate the soluble impurities from the water absorbed, I was at a loss to conceive how such a quantity could escape from the minute apex, which it always did, and not from sundry other spots then trickling towards the point, previous to its falling from the leaf.

As the escape of this fluid does not often occur when the plant is out of doors, or if the sun shines on it when confined under glass, it was imagined that under either of these conditions the evaporation from the surface of the plant might be sufficient to carry off any excess of water sent by the roots into the interior, under the stimulus of increased temperature; and that when evaporation could not so proceed, the channels which conveyed the fluid became surcharged, and the apex, which seems as it were the confluence of numerous minute streams, gives exit to the excess collected on account of suppressed evaporation.

It became necessary to apply to the anatomy of the leaf in order to account for and prove the escape of the fluid from the apex. The leaves of this plant are arrow-shaped, and terminated by a nearly cylindrical point, varying from half an inch to three quarters in length, and about the twentieth part of an inch in diameter. The venation makes one of the exceptions to the general rule, that the leaves of all Endogens are straightly veined, for in this leaf is to be noticed an arrangement of veins somewhat analogous to that of an Exogenous plant, being in this instance especially allied to the leaf of a plant belonging to the order Myrtaceæ, on account of the presence of a distinct marginal vein. A strong midrib proceeds from the petiole for some distance up the leaf, and is gradually attenuated and expended by giving off numerous branches, which take a curved direction outwards and forwards, and which are intercepted before they reach the margin, by the vein running parallel to the circumference, which has its commencement at the petiole and its termination in the apex; consequently each vein has a tendency to carry its fluid towards the apex by the intervention of this marginal vein. And there is no doubt that the fluid is conducted by these courses, for if any one be wounded by a sharp instrument, dropping will proceed from the wound as well as from the point; besides, the veins do not form prominent opaque ribs as in many exogens, but are level with the surfaces of the leaf; and when examined by transmitted light they appear the most transparent portions, an indication of their being full of fluid.

If the attenuated apex of the leaf be examined by dissection, microscopically, it will be found to present some few stomata on its cuticle and a dense bundle of vessels in its centre, surrounded by cellular tissue containing multitudes of acicular raphides; and I could never carry the dissection fine enough to discover whether or not these vessels communicate with the surface or the caverns with which the stomata are connected.

From the anatomy of the leaf it would appear that the surcharged vessels all propel their contents towards its point, and the excess finds the means of escape as through a filter.* It cannot be from gravity, for it occurs whilst the young leaf is making its appearance, before it unrols, when the sharp-pointed apex is in the most elevated position, being quite perpendicular. If it occurred only when the leaf was pendulous, it might be imagined that the liquid was condensed in the cavernous tissue of the leaf, and escaped through the stomata from gravity; but as this is not the case, it must be considered that this peculiarly constructed apex is a beautiful provision—a kind of natural safety-valve, for permitting the superabundance of watery fluid to be readily removed, the retention of which might be connected with unhealthy action in the economy of this elegant plant.

The escape of fluid from the apex of the leaf is not peculiar to Richardia, as many other plants, when grown under glass will exhibit the phenomenon, as young plants of barley and wheat; consequently I conceive that there must be some special contrivance of nature in these leaves, perhaps in all leaves, to guard against the accumulation of watery fluid.

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* The apex of the spathe, in its early state, will also exhibit the phenomenon; as will also a leaf when a fifth of its point has lost the signs of vitality.

The opportunity of witnessing these experiments can in no way be so successfully obtained, or their results so satisfactorily examined, as in Mr. Ward's cases; which gives us another instance of the useful adaptation of this plan to the pursuit of experimental inquiries respecting the functional operations performed during the growth of plants.

EDWIN J. QUEKETT.

50, Wellclose Square,
May 16th, 1842.

ART. LXVII. — *Analytical Notice of a treatise 'On the Growth of Plants in Closely Glazed Cases.'* By N. B. WARD, F.L.S. London: John Van Voorst. 1842. 8vo.

THE lovers of Nature and of Nature's works are deeply indebted to the author of this treatise, for showing them by what means plants may be made to grow and thrive in situations where few could even exist before. For although the fact that plants will live and grow without direct communication with the external atmosphere, may have been often observed long before the fern and grass sprang up in Mr. Ward's closed glass cylinder, yet to that gentleman is undoubtedly due the sole merit of so closely reasoning upon a simple circumstance unexpectedly brought under his notice, as to have deduced from it principles which have already led to important results, while it is not improbable that consequences still more important yet remain to be disclosed.

By means of this mode of cultivating plants, the botanist may create for himself, even within the "brick-wall bounds" of any of our large towns, such a scene of natural beauty as will in some measure compensate for his exclusion from the pleasure of studying his favorites in their own native haunts. In many respects indeed he will be a gainer, in the facilities for study afforded by the naturalization of the denizens of the wild wood or the snow-capped mountain under his own roof, nay, even by his own fire-side: for rarely is a botanist placed in such favorable circumstances as to be able to do more than collect specimens of plants, as they are met with in his too often hurried excursions; and specimens so collected generally form the only materials with which is reared many a plausible hypothesis relating to specific distinction or identity. But now the student may have his plants living under his own eye — may watch their growth from day to day — from hour to hour. In the case of a fern, he may scatter its sporules and observe the first appearance of the slightest possible tinge of green on the surface of the soil; then after a time he will note the expansion of the first seedling fronds; and so step by step proceeds the progress of development, until he perceives with delight —

> "Each stem and leaf wrapped small,
> Coil'd up within each other
> Like a round and hairy ball."

Then again how closely may he

> ——— "Watch that ball unfolding
> Each closely nestling curl,
> And its fair and feathery leaflets
> Their spreading forms unfurl!"

And all this pleasure and instruction he may secure, even in the most impure atmosphere, by the simple expedient of surrounding his protégés with glass, which, while it allows of the free passage of light, — a most essential condition in the culture of plants, effectually prevents the access of fuliginous matter and loss of moisture by evaporation, and at the same time ensures a calm atmosphere and a more equable temperature.

In the treatise before us Mr. Ward has published the results of his thirteen years' experience in the mode of growing plants in closely glazed cases. The work is divided into six chapters, and the contents of these we give below.

Chap. I.—*On the Natural Conditions of Plants.* Unless we possess some knowledge of the conditions which regulate the growth of plants in a state of nature, it is evident that our treatment of them in cultivation must be more or less defective. These conditions vary in an almost endless degree; plants being "influenced by the atmosphere, heat, light, moisture, varieties of soil, and periods of rest." The growth of plants is most sensibly affected by the purity or impurity of the atmosphere: the heat to which they are subjected has a range, at different seasons and in different countries, of not less than 150°: the intensity of light "varies from almost total darkness to a light double that of our brightest summer's day:" then again "the states of moisture vary as much as those of heat and light": varieties of soil also visibly affect plants: and lastly—

> "All plants require rest, and obtain it in some countries by the rigour of winter; in others by the scorching and arid heat of summer. Some, "after short slumber wake to life again," while the sleep of others is unbroken for many months. This is the case with most alpine plants, and is necessary to their well-being. * * In Egypt the blue water-lily obtains rest in a curious way. Mr. Traill, the gardener of Ibrahim Pacha, informed me that this plant abounds in several of the canals at Alexandria, which at certain seasons become dry; and the beds of these canals, which quickly become burnt as hard as bricks by the action of the sun, are then used as carriage-roads. When the water is again admitted the plant resumes its growth with redoubled vigour."—p. 5.

On the power possessed by plants of adapting themselves in a certain degree to the circumstances in which they are placed, the author remarks:—

> "To suit all the varied conditions to which I have thus briefly alluded, and under which plants are found to exist, they have been formed by their Almighty Creator of different structures and constitutions, to fit them for the stations they severally hold in creation; and so striking are the results, that every different region of the globe is characterized by peculiar forms of vegetation. A practised botanical eye can with certainty, in almost all cases, predict the capabilities of any hitherto unknown country, by an inspection of the plants which it produces. * * But in order to give us a clearer idea of the "strong connexions, nice dependencies," existing between climate and vegetation, let us survey plants in a state of nature. We shall find some restricted to certain situations, while others have a wide range, or greater powers of adaptation. It is not perhaps going too far to assert, that no two plants are alike in this particular, or in other words, that the constitution of every individual plant is different. Of the former, Trichomanes speciosum is an example, it not being able to exist, even for a short time, in a dry atmosphere: of the latter, familiar examples are presented to us in the London Pride and the Auricula; these of course grow in greater or less luxuriance, as the conditions are more or less favorable."—p. 6.

Chap. II.—*On the Causes which interfere with the Growth of Plants in large towns.* Among these are more particularly mentioned "deficiency of light, the dryness of the atmosphere, the fuliginous matter with which the air of large towns is always more or less loaded, and the evolution of noxious gases from manufactories." The author expresses his belief that the generally depressed state of vegetation in large towns, is chiefly due to the quantity of soot floating in the atmosphere; and that although deficiency of light and moisture certainly exerts an influence to a certain extent, yet that neither of these, nor the evolution of noxious gases, nor the three combined, is the sole or even the chief enemy to the growth of plants in a town atmosphere. After quoting from Mr. Ellis's paper in the

'Gardeners' Magazine' for September, 1839, that part which relates to the observations and experiments of Drs. Turner and Christison on the effects of sulphurous and muriatic gases upon vegetation, the author observes :—

> "The correctness of the above observations of Messrs. Turner and Christison, as to the effects of sulphurous and muriatic acid gases upon plants, cannot for one moment be doubted; and that plants suffer when exposed to a direct current of these gases, before there is time for diffusion through surrounding space, is equally matter of fact; but I contend, that it yet remains to be proved that there exists generally in the atmosphere of London, or other large cities, such a proportion of these noxious gases as sensibly to affect vegetation. We shall find in the windows of shops and small houses, in numerous parts of London, hundreds of geraniums and other plants, growing very well and without any crisping or curling of the leaves, care being taken in these instances to keep the plants perfectly clean and free from soot; and it is certain, that although my cases can and do exclude the fuliginous portion of the atmosphere, and certainly protect the plants from the effects of any direct current of hurtful airs, they cannot exclude that portion which becomes mixed with the atmosphere."—p. 17.

The author gives various examples of the rapidity with which gases mingle with each other and with the atmosphere, under the influence of "a law constantly in action under all circumstances" and in all places, by means of which the several constituents of the atmosphere are ever preserved in their respective proportions.

Chap. III.—*On the Imitation of the Natural Conditions of Plants in closely glazed Cases.* At the commencement of this chapter the author gives such a pleasant description of the frustration of his early attempts to obtain something like country within the smoke of London, and of the occurrence which led to his subsequent success, that we must quote the passage entire.

> "The science of Botany, in consequence of the perusal of the works of the immortal Linnæus, had been my recreation from my youth up; and the earliest object of my ambition was to possess an old wall covered with ferns and mosses. To obtain this end, I built up some rock-work in the yard at the back of my house, and placed a perforated pipe at the top, from which water trickled on the plants beneath; these consisted of Polypodium vulgare, Lomaria spicant, Lastræa dilatata, L. Filix-mas, Athyrium Filix-fœmina, Asplenium Trichomanes, and a few other ferns, and several mosses procured from the woods in the neighbourhood of London, together with primroses, wood-sorrel, &c. Being, however, surrounded by numerous manufactories and enveloped in their smoke, my plants soon began to decline, and ultimately perished, all my endeavours to keep them alive proving fruitless. When the attempt had been given up in despair, I was led to reflect a little more deeply upon the subject in consequence of a simple incident which occurred in the summer of 1829. I had buried the chrysalis of a Sphinx in some moist mould contained in a wide-mouthed glass bottle, covered with a lid. In watching the bottle from day to day, I observed that the moisture which during the heat of the day arose from the mould, became condensed on the

internal surface of the glass, and returned whence it came; thus keeping the mould always in the same degree of humidity. About a week prior to the final change of the insect, a seedling fern and a grass made their appearance on the surface of the mould."—p. 25.

After briefly stating the reflections to which this unexpected event gave rise, and having mentioned the conclusions arrived at, the author proceeds: —

"Thus, then, all the conditions necessary for the growth of my little plant were apparently fulfilled, and it remained only to put it to the test of experiment. I placed the bottle outside the window of my study — a room facing the north, and to my great delight the plants continued to grow well. They turned out to be Lastræa Filix-mas and Poa annua. They required no attention, the same circulation of the water continuing; and here they remained for nearly four years, the Poa once flowering and the fern producing three or four fronds annually. At the end of this time they accidentally perished, during my absence from home, in consequence of the rusting of the lid, and the admission of rain water."—p. 26.

The author next details his experiments on different plants, including Trichomanes speciosum, Hymenophyllum, Jungermanniæ, and Crocuses both with natural and artificial light; and describes his Tintern-Abbey house, his alpine case, drawing-room case and case with spring flowers; thus exhibiting to his readers the gradual development of his plans, until he conducts them to his "largest experimental house." In this house, erected in the scene of his early disappointments, perhaps on the very site of the rock-work on which no attentions could prolong the existence of some of our hardiest native plants, we now see not only the "wall covered with ferns and mosses," — the earliest object of the author's ambition, but a host of botanical treasures from all parts of the globe growing side by side in the greatest luxuriance and beauty: the ferns especially, both native and foreign, appear to be quite at home; the tender and delicate Trichomanes speciosum being one of the most lovely objects in the collection, and Osmunda regalis, planted in March last, now has its noble fronds crowned with fructification.

The chapter concludes with the following remarks upon "the importance of reflecting on what we see around us."

"The simple circumstance which set me to work must have been presented to the eyes of horticulturists thousands of times, but has passed unheeded in consequence of their disused closed frames being filled with weeds, instead of cucumbers and melons; and I am quite ready to confess, that if some groundsel or chickweed had sprung up in my bottle instead of the fern, it would have made no impression upon me: and again, after my complete success with the ferns, had I possessed the inductive mind of a Davy or a Faraday, I ought, in an hour's quiet reflection, to have anticipated the results of years. I should have concluded that all plants would grow as well as the ferns, inasmuch as I possessed the power of modifying the conditions suited to the wants of each individual."—p. 42.

Chap. IV.—*On the conveyance of Plants and Seeds on Ship-board.* After some observations on the means formerly employed for the preservation of plants during long voyages, the author thus proceeds:—

"But by far the greater number of plants require to be kept growing during the voyage; and, prior to the introduction of the glazed cases, a large majority of these plants perished from the variations of temperature to which they were subjected,—from being too much or too little watered,—from the spray of the sea,—or, when protected from this spray, from the exclusion of light."—p. 46.

The author's reflections on these causes of failure induced him, in June, 1833, to send out to Sydney two experimental cases filled with ferns and grasses, nearly the whole of which arrived there "alive and flourishing:"—

"The cases were refilled at Sydney in the month of February, 1834, the thermometer then being between 90° and 100°. In their passage to England they encountered very varying temperatures. The thermometer fell to 20° in rounding Cape Horn, and the decks were covered a foot deep with snow. At Rio Janeiro the thermometer rose to 100°, and in crossing the line to 120°. In the month of November, eight months after their departure, they arrived in the British Channel, the thermometer then being as low as 40°. These plants were placed upon the deck during the whole voyage and were not once watered, yet on their arrival at the docks they were in the most healthy and vigorous condition."—p. 46.

Subsequent experiments with plants of a higher order were equally successful; and the following extract of a letter to the author from Mr. George Loddiges, is confirmatory of the importance of the plan.

"My brother and I have, since 1835, made trial of more than 500 cases to and from various parts of the globe, with great variety of success; but have uniformly found, wherever your own directions were strictly attended to,—that is, when the cases were kept the whole voyage in full exposure to the light, upon deck, and care taken to repair the glass immediately in cases of accident,—that the plants have arrived in good condition. * * Some of the cases have been opened in fine order after voyages of upwards of eight months: in short, nothing more appears to be wanting to ensure success in the importation of plants, than to place them in these boxes properly moistened, and to allow them the full benefit of light during the voyage."—p. 86.

Full instructions are given for the construction of the cases and the preparation of the plants for the voyage.

Chap. V.—*On the application of the closed plan in improving the condition of the Poor.*

"Among the numerous useful applications of the glazed cases, there is one which

I believe to be of paramount importance, and well deserving the attention of every philanthropist: I mean its application to the relief of the physical and moral wants of densely crowded populations in large cities. Among the members of this population there are numbers, who, either from early associations, or from that love of Nature which exists to a greater or less degree in the bosom of all, are passionately fond of flowers, and endeavour to gratify their taste at no small toil."—p. 57.

After some observations on the importance of the free admission of light into human habitations, and on its influence upon the animal economy as well as upon vegetation, the author shows in what manner the innate love of Nature above alluded to may be gratified at a trifling expense. He however cautions the poorer classes "against indulging a taste for what are called fancy flowers—things which this year are rewarded with gold medals, and the next are thrown upon the dunghill" — as being opposed to the legitimate pursuits of horticulture. The benefical effects of the study of Botany are next dwelt upon; and the interesting anecdote of Parke and the moss concludes the chapter.

Chap. VI. — *On the probable future application of the preceding facts.* The Wardian cases evidently furnish great facilities for experimenting on numerous doubtful matters connected with Botany, Horticulture and Agriculture, such as the effects of different soils and manures; the power of the roots in the offices of absorption and selection; the determination of the existence and nature of excretions from the roots, whether poisonous or otherwise; "the effects of poisons upon plants;" "the influence of light in protecting plants from the effects of low temperature;" various points respecting the development and growth of Fungi, and the other lower orders of vegetation; and the investigation of "that debatable ground on the confines of the animal and vegetable kingdoms, where in our present state of ignorance it is often impossible to determine the point at which one ends and the other begins;" — these are but a few of the *quæstiones vexatæ* in the settlement of which the glazed cases may be used with great advantage.

The author next adverts to the application of the principle on a large scale as "a remedial means of the highest order" in the treatment of numerous diseases which would readily yield "to the renovating influence of pure air," although without this auxiliary the skill of the medical man may be of little avail. He more particularly mentions measles and consumption as diseases in which a supply of pure air and a properly regulated atmosphere are of the greatest importance; and after speaking of the direct mortality arising from measles in crowded districts of large towns, as well as the numbers of persons who die of diseases superinduced by neglect during the measles, he thus concludes :—

> "With respect to consumption, could we have such a place of refuge as I believe one of these closed houses would prove to be, we should then be no longer under the painful necessity of sending a beloved relative to a distant land for the remote chance of recovery, or too probably to realize the painful description of Blackwood : — "Far away from home, with strangers around him,—a language he does not understand,—doctors in whom he has no confidence,—scenery he is too ill to admire,—religious comforters in whom he has no faith,—with a deep and every day more vivid recollection of domestic scenes,—heart-broken,—home-sick,—friendless and uncared for, — he dies." —p. 71.

The interest we feel in the subject and our conviction of its importance, have perhaps led us to extend our notice of Mr. Ward's useful book somewhat beyond our prescribed limits ; we however feel assured that we shall be readily excused for this by such of our readers as have used the Wardian cases, whether on the same humble scale as ourselves, or in the more superb style of Mr. Ward's own large fernery. In conclusion, we would advise all whose love of Nature is not to be suppressed by the din and smoke of large towns, immediately to set to work, and we can venture to promise that the trifling trouble and expense they may be at, will be amply repaid by the gratification and the instruction they will derive from their observations 'On the growth of plants in closely glazed cases.'

Art. LXVIII. — *Notice of a 'History of British Forest Trees, Indigenous and Introduced.'* By Prideaux John Selby, F.L.S., M.W.S. &c. London : John Van Voorst. Parts 4—9.

The illustrations increase in beauty and the descriptions in interest as the work proceeds. The details of the inflorescence are drawn, engraved and printed in masterly style : the catkins of the goat willow at p. 168, of the aspen at p. 188, and of the alder at p. 221, are extremely pretty. Some of the vignettes also merit the highest praise : the artist's "bit" at p. 193, with its cool and quiet shade, is "beautiful exceedingly," and so is the peep into a wood at p. 237. The portraits of the trees themselves still somewhat dissatisfy us : notwithstanding the skill and labour bestowed on them, the result is far from satisfactory. We are ever ready to exclaim, "What a beautiful tree!" but we always refer to the accompanying letter-press to learn its name. It would appear to be a task of infinite difficulty to portray a tree so exactly that its figure shall convey to the beholder a warrant of its identity. A familiar bird or insect is recognized at sight; but who shall select an oak, an ash, or an aspen from among the most faithfully drawn group of forestry? The fault is perhaps in the subject, not in the manner of execution. How many are there who, seeing the trees themselves tossing their sinewy branches in the breeze, would be unable to refer each to its particular species; how difficult therefore must it be for the pencil to seize on characters which the experienced eye shall often fail to detect! The work, in fine, must rest its claim to public patronage on the correctness of its details and the completeness of its descriptions, rather than on any striking likeness in the portraits of the trees themselves.

The author's remarks on the comparative value of timber are highly interesting and valuable. The Black Italian or Necklace Poplar (*Populus monilifera*) is the subject of high encomium. "The wood is of a greyish white colour, tough when seasoned, and if kept dry very durable; its great size renders it fit for the largest buildings, and as flooring for manufactories and other erections nothing can surpass it, as in addition to the property of not splitting by percussion, it possesses the peculiar advantage of not easily taking fire, and even when ignited burning without flame or violence."—p. 201. The last-named quality is an excellence of more than ordinary importance: what an amount of human life and property might be saved by the use of timber which would thus arrest or even retard the awful power of flame!

Speaking of the beech Mr. Selby tells us that when this noble tree is grown singly or in hedgerows it is, "from its dense and widely-extended shade, and the deleterious nature of its drip, more injurious to the herbage beneath than any other tree: and here we may also remark, that one of the greatest disadvantages attending Beechen woods or groves, is that no underwood or herbage, with the exception of some Orchideous and Cryptogamic plants, will thrive beneath their shade: even the hardy holly, a plant that flourishes and bears, comparatively unhurt, the drip and shade of many other trees, pines and languishes under the Beech; laurels and other evergreens, as well as deciduous shrubs, all speedily die when planted beneath its shade." —p. 312. Does not our author here lay too much stress on the drip of the beech? We should hesitate before attributing this deleterious effect to any other cause than the exclusion of light, for we have often seen young beech contending for the mastery with a vigorous undergrowth of holly and wych elms; and although the beeches have outstripped their fellows, which much consequently receive their drip, yet all are growing together in the most perfect amity and vigour. "For narrow upright hedges, to divide or enclose nursery grounds, gardens, or even small fields, the beech is superior to the hornbeam, or any other deciduous tree, as it not only bears the shears equally well, and may be trained to as great a height, but retains the leaves during winter, thus affording additional shelter and warmth, and giving a richness of appearance the others do not possess."—p. 315.

It is perhaps generally known that the Spanish chesnut, although here only occasionally eaten by the lower classes, forms in Italy and Spain a most important article of their food, serving in great measure as a substitute for bread or potatoes. The nuts are variously prepared, sometimes simply boiled or roasted, at others ground to flour; "of this flour, *la Galette*, a thickish kind of girdle cake, mixed up with a little milk and salt, and sometimes with the addition of eggs and butter, is made; *la polenta* is also another preparation made by boiling the chesnut flour in milk till it becomes quite thick; when made with water, it is eaten with milk in the same manner as oatmeal porridge in the north of England and Scotland. *Chatigna*, that is, chesnuts boiled and then mashed up as we do potatoes, is also another preparation common in France and Italy."—p. 329.

Of the Pine Mr. Selby gives a very complete and valuable history, detailing the botanical characters of the family to which it belongs, the peculiarity of its wood differing from that of dicotyledonous trees, the geographical distribution, the requisite soil, and various other particulars. With the following pleasantly written account of the fructification of the common pine we must conclude.

> "The male flowers or catkins, when in bloom, are from half an inch to upwards of an inch long, and are placed in whorls at the base of the young shoots of the current year; the flowers contain two or more stamens with large yellow anthers, which discharge a sulphur-coloured pollen in great abundance. The embryo cones or female flowers appear on the summits of the shoots of the year, in number from two to as many as six, and of a green or purplish green colour. When impregnated, they become lateral and reflexed, and cease to increase in size till the following spring, when they again begin to swell, and by July attain their full size, ripening by degrees into ovate, pointed and tessellated, hard, woody cones, from one inch and a half to two inches long. These remain on the tree for a considerable time afterwards, though the seeds are discharged the following spring, and it is then that trees are frequently seen with cones in four different stages: viz., in the youngest or embryo state; in an unripe or green condition, but of full size; in a matured state, or when they have become brown; and lastly with the scales expanded, after the seed has been shed."—p. 396.

ART. LXIX.—*Varieties.*

152. *Enquiry respecting the Parasite on the Goldfish,* (Phytol. 190). In the last No. of 'The Phytologist' there is a notice of a paper read by Mr. Goodsir on the 11th of January last, at a meeting of the Botanical Society of Edinburgh, on a vegetable found on the gills and fins of a goldfish. Although Mr. Goodsir "gave a minute description of the parasite, explaining practically its form, structure, mode of fructification, &c." you have not even favoured your readers with the name of the vegetable, or given the slightest account of it. This I very much regret, as a friend of mine a few weeks since sent me a small carp, which he had kept in a pond, and which, it would appear, died from the same disease as that mentioned by Mr. Goodsir. We examined this fish, and found it covered with a minute vegetable substance, which we supposed to be a Conferva. Around the operculum it was very thick, and apparently obstructed the opening of this valve; the gills too were very much ulcerated and almost united into one mass by the parasitic covering. The internal organs were also inflamed, and near the heart we found a transparent mass, filled with a fluid, and which we conceived to be a hydatid.—*Hy. Jno. Turner; 47, Lower Stamford St., Blackfriars Road, April,* 1842.

[Our notice of Mr. Goodsir's paper was given verbatim from the report published in the Edinburgh Evening Post. We cannot learn that the parasite has yet received a name, and the only description we can meet with we have given below; it is from a report in Taylor's 'Annals' of the February meeting of the Royal Society of Edinburgh. Mr. John Quekett has obligingly furnished us with a notice of a very interesting fact observed by him in connexion with this parasite, which we have great pleasure in inserting.—*Ed.*]

153. *Description of the Vegetable parasitic on the Gold-fish.* "The concluding part of Dr. J. H. Bennet's paper on Parasitic Fungi growing on living animals was read, and as portions of it bear directly on Natural History, we shall briefly allude to these. Fungi of this description have previously been noted as occurring in the stickleback and common carp, but we are not aware that any particular description has yet been supplied of these fungi. Dr. Bennet had an opportunity of examining them upon the gold carp, Cyprinus auratus, having been persistent before death. To the eye they presented the appearance of a white cottony or flocculent matter attached to the animal. Under the microscope it presented two distinct structures, which were severally cellular and non-cellular. The former consisted of long tubes divided into elongated cells by distinct partitions. At the proximal end of several of these cells was a transparent vesicle about ·01 of a millimetre in diameter, which the author considered to be a nucleus. Some of the cells were filled with a granular matter; others however were empty, the granules having escaped through a rupture of the tube or of the cellular walls. Besides these there were long filaments about ·06 of a millimetre in diameter, which apparently sprung from the sides of the cellular tubes. They were uniform in size throughout their whole length, and were formed of an external delicate diaphanous sheath, and an internal more solid transparent matter. This vegetable structure sprung from a finely granular amorphous mass. Fungi of a similar kind were also found in the lungs of a man who died of pulmonary consumption, and from whose lungs they were also copiously discharged in the expectoration during life. The vegetable structure in this instance consisted of tubes, jointed at regular intervals, and

giving off branches generally dichotomous. They varied in diameter from ·01 to ·02 of a millimetre, and appeared to spring without any root from an amorphous, soft, finely granular mass. They gave off at their extremities numerous oval, round or oblong corpuscules, arranged in bead-like rows, which were considered reproductive sporules. The same appearances were found in the soft cheesy matter lining some of the tubercular cavities after death." — *From the 'Annals and Magazine of Natural History,' March*, 1842, *p*. 66.

154. *Note upon the Fungus parasitical on fishes.* Having seen that Mr. Goodsir of Edinburgh has described the parasite which infests the bodies of gold carp and other fishes, I imagined that the following incident concerning it might not prove uninteresting to your readers. About a month since I placed six newts in a tank of water in which there were some aquatic plants, and three small fish commonly called sticklebacks. One of these, the largest of the three, had the hinder part of its body covered with the plant. The newts had not long been in the tank, when my brother, Mr. Edwin Quekett, and myself, saw one of them in the act of nibbling away at the parasite, whilst the fish remained perfectly quiet: on disturbing them the same thing was repeated by another newt; the fish appeared much pleased, and even moved its tail frequently towards the newt, as though it were anxious to get rid of the parasitic growth. Whether the act of the newt were dictated by kindness I cannot say; probably these animals perform (as tench are said to do) the office of physicians to the diseased portion of the finny race.—*John Quekett; 50, Wellclose Square, May* 23, 1842.

155. *Note on the Oxlips from Bardfield, &c.* The oxlips kindly sent to me by Mr. H. Doubleday from Bardfield (Phytol. 204), and concerning which you enquire, appear to me to be the species intended by the figure in 'English Botany' (513), and also to be identical with Swiss and German specimens in my herbarium, which were sent to me under the name of "Primula elatior, *Jacq*." The Bardfield specimens differ slightly from the figure in 'English Botany,' but not importantly, except in having the calyx decidedly shorter than the tube of the corolla. They are unlike any other English oxlips in my herbarium (all of which may be gradually traced either to the primrose or to the cowslip, by intermediate links), and, as appears to me, they may be safely pronounced the real representatives of Primula elatior. The dubious oxlip, gathered last year at Claygate, and mentioned in your first number (Phytol. 9), has this year flowered in my garden. It there grows in a much drier and a less shaded situation than that in which the wild root was found. In the form of the calyx, corolla, and leaf, it is now decidedly a primrose, although the umbel is elongated on a stout scape of five inches in height. In the deep colour of the corolla and the tint of the leaves, it has more nearly the cowslip hues: the pubescence is intermediate, but nearer that of the primrose. I consider the plant to be an umbelled primrose, but cannot account for the cowslip colours. Preparations for a botanical tour to the Azores (for which I expect to sail in two or three days) have prevented my giving attention to the subject of the oxlips this spring; and sundry experiments bearing upon the question of their relations to the cowslips and primroses that had been commenced will be interfered with by my absence, which I anticipate will continue for the whole summer and autumn. As far as my observations go, there is not any one point in the specific characters ordinarily given for the primrose and cowslip, which is constant in either. Each characteristic of the primrose may be seen in specimens that otherwise would be called cowslips, and *vice versâ*. The least variable, perhaps, are the very short and close pubescence of the cowslip, and the long weak hairs of the primrose. I have

never seen the primrose with obtuse sepals, however, though the cowslip has the sepals acute, obtuse, or quite rounded at the apex. The experiments on which Professor Henslow lays so much stress, are certainly of great value in relation to the distinctions of species, not merely in the genus Primula, but for systematic Botany generally. Still, they may be said to require confirmation; and one confirmation which appears to be requisite, is, that the experiment should be repeated by some botanist who would studiously avoid letting his gardener or any other party know the object of his experiment. I was once told by a gardener, that he had *helped* his master's horticultural experiments, during the absence of the latter, so as to produce the results which he supposed would gratify his master.—*Hewett C. Watson; Thames Ditton, May* 1, 1841.

156. *On the immersion of Specimens of Plants in Boiling Water*, (Phytol. 189). Having been induced from a report in 'The Phytologist' to try the effect of boiling water in preserving the colours of botanical specimens, I was much disappointed to find that it was, with me, quite ineffectual. Lathræa squamaria, one of the plants mentioned in the report, turned completely black on remaining in boiling water ten seconds; and in one specimen which was but partially immersed, that part only turned black, whilst the remainder has preserved its colour in a slight degree. By the same treatment the colour was extracted from the flowers of Orchis mascula, leaving the petals of a dirty brown hue; whilst specimens dried by the usual method partially retained their colour, and certainly their *form*, which the *boiled* ones did not. Specimens of other plants which I tried were all acted upon in a similar manner. It certainly appears very strange to me that others should succeed so perfectly, whilst I, using exactly the means prescribed, could not succeed in the least; and I think there must be something more than has yet appeared, either in the water or the subsequent treatment, in order to preserve the colour of such plants as Lathræa squamaria &c.—*Joseph Sidebotham; 26, York St., Manchester, May* 5, 1842.

157. *True office of the Earth in relation to Plants.* As the article 'On the true office of the earth in relation to plants' (Phytol. 173), seems to have been penned for the purpose of exciting discussion, I am surprized that you have as yet had no communications on the subject. I take the liberty of sending you a few remarks, as I cannot subscribe to the opinion which, in that article, Mr. Newman has endeavoured to maintain. The feeding of plants in order that they may afford food for man, is an important subject at this time; and if I understand Mr. Newman rightly, he maintains that the earth or soil in which they grow has nothing to do with the supplying this food. He makes this inference from the fact that hyacinths grow in water; and to this instance he might have added those of floating water-plants, of most of the Orchideæ, and a number of mosses, lichens, &c., which evidently derive their nutriment from sources independent of those constituents of the earth or soil in which they do *not* grow. But this does not at all prove Mr. Newman's position, that those plants which grow in the earth do not derive their sustenance from the soil in which they are placed. The fact is that plants, like animals, require different kinds of food, and they are always naturally placed in those positions in which they are best supplied with their peculiar food. All plants, it may perhaps be stated, require for their growth water and carbonic acid, and they obtain these from the soil or the atmosphere, according to their structure, which is adapted to the peculiar localities in which they live. The plants of the deep sea, and most of the lower forms of Cryptogamia, obtain these agents by their whole surface; but in the higher forms of Phanerogamous vegetation, the function of absorption is exceedingly localized, and these plants seem to be almost con-

fined to the extremities of their roots — the spongioles, as a means of obtaining food. These spongioles are placed in the soil, and from the soil, and from no other source, do they derive their water and carbonic acid. It is this that makes carbonaceous soils so valuable when any agent is added to them that will facilitate the union of their carbon with oxygen, and thus supply to plants an abundance of carbonic acid. On the necessity of water as a food for plants I need not dwell; and that this alone enters plants from the soil is proved by the flourishing vegetation of a swamp during a drought, compared with the withered aspect of the same on hills and well-drained fields. But water and carbonic acid are by no means the only food of plants; there are other matters which they derive from the soil, and which they cannot get from any other source. The various saline and earthy constituents of plants are derived from the soil; and unless these are supplied the plant perishes. The nature and proportion of these vary very considerably in different families, but in most cases they are essential, if not to the existence, at least to the health and productiveness of the plant. Of these substances the phosphates, nitrates and carbonates of lime, potassa and soda, silica and ammonia, may be given as examples. It is a knowledge of this fact that is now giving such an impetus to the enquiry concerning the manuring of plants, and which, far from leading to the conclusion that the composition of the soil is of little importance, attaches to it the utmost value. For this purpose the vegetable physiologist has called in the aid of the chemist; and Dr. Daubeny, at a late meeting of the Agricultural Society, presented a plan for keeping a debtor and creditor account between the soil and plants that grew on it, seeing that the latter took away that which the former possessed. It is a knowledge of this fact that gives the true theory of the rotation of crops, the necessity for which does not arise from the excretions of a plant being poisonous to itself and not to another, but from the fact that plants abstract from the soil the whole of an ingredient that, as food, is necessary for their health; this is not supplied till after the next manuring. That the earth supplies ingredients necessary to the existence of plants, is also proved by their distribution on the surface of the globe, independent of height, of heat and light, which are so important; some plants grow on one stratum and some on another; and many plants are known to geologists as determining the existence of particular rocks, whose particles are mingled with the soil. I cannot therefore admit that the earth is “simply a receptacle for roots,” for the very constituents of which the earth is composed, are constantly undergoing decomposition and entering into the structure of the plant; and had not the earth naturally or by artificial means a peculiar constitution, the plants which grow on it could not exist.—*Edwin Lankester; 43, Hart Street, Bloomsbury, May* 6, 1842.

158. *Note on Sagina apetala* and *maritima.* In the numerous examples of Sagina apetala which I have witnessed, I have never failed to detect rudimentary petals, (see ‘British Flora’). This obtains also in the maritime variety found in Anglesea, near Beaumaris. S. maritima is strictly apetalous. The latter species I have never seen growing at Warrington: the nearest habitat known to me is Runcorn Gap, on the Mersey.—*W. Wilson; Warrington, May* 6, 1842.

159. *Carex tenella,* (Phytol. 128). A word on this subject. I have no doubt that the figure of Schkuhr has been seen by the author of ‘British Flora,’ and I think there is good evidence of its having been consulted at the very time when that part of the ‘British Flora’ was written. The mistake, if any has been made, may even have been caused by relying too implicitly on Schkuhr’s figure of the ripe fruit. This, in Sir J. E. Smith’s opinion, has been taken “from a starved specimen of *C. loliacea,*” which

has "fruit *flat on one side*," ('Eng. Flor.' 83). Mr. Gibson appears to have misconceived the meaning of the question which he so freely criticises; the doubt evidently refers to the Scottish specimen, and not to the *species* called C. tenella.—*Id.*

160. *Isoetes lacustris.* Had I known of Mr. Newman's intention to describe the fructification, I would have sent my own recorded observations earlier. In some of the fertile capsules, only one central columnar bar from back to front was visible, but in other cases, and especially in those which seemed to contain male organs, there were ten such bars, ranged on each side of the thickened central line which runs down the back. No good evidence appeared that these bars were receptacles for the seeds. On the inner side of the frond, immediately above the capsule, a rounded membranous scale is observable, having a depression at its base. It has an evident communication with the capsule. In one instance two scales were seen, one placed above the other. The so-called anthers were alike furnished with scales. In the "normal form" from Llyn y Cwn, I observed that the seeds were much more numerous and smoother than in the slender variety from Ffynnon Frech, the capsules were also larger, with twelve bars or pillars from back to front. In the capsule of the slender variety the seeds were from thirty to forty in number, with winged sutures; not the least trace of any pedicel could be found. The above remarks seemed to me less likely to be accurate than those of Mr. Valentine, which, founded as they are on subsequent observation and most diligent scrutiny, must be regarded as worthy of the highest credit. One conclusion drawn by him was, that no essential difference existed between the fertile and the so-called male fructification.—*Id.*

161. *Myrica Gale with androgynous flowers.* I enclose a few specimens of Myrica Gale with *androgynous flowers*, that is, with the flowers united in the same glume, not simply monœcious. In the same catkin you will find the lower portion principally occupied with barren flowers, the upper portion with fertile flowers, and the intermediate portion with the flowers united. The whole bush, whence the specimens were obtained, had catkins of this character; it still grows on the borders of Risley Moss, near this place, and can easily be found again.—*Id.*

162. *Notes on Monotropa.* It may not be amiss to make a few more observations on Monotropa. The description of the root of M. Hypopitys in 'English Botany,' t. 68, is applicable enough to Mr. Lees' plant, but not to that which grows at Southport, and which seems also to differ from the true M. Hypopitys in its drooping flowers. With respect to the scent of the true species, it would seem, according to Smith's observation, that it becomes evident only when the plant has "arrived at maturity, and then acquiring a fragrant smell, generally compared to primrose roots, but rather resembling those flowers." My Southport specimens, therefore, though they should not prove to belong to a distinct species, are not necessarily opposed to Mr. Lees' perceptions, for they were gathered early in the season. Perhaps I have erred in not sooner replying to Mr. Lees' observations, (Phytol. 171). My silence has been entirely owing to an aversion from anything which has a tendency to defeat the object for which 'The Phytologist' is intended, as a vehicle of information. The perfect good humour with which Mr. Lees has received my former comments, assures me that I have given no offence, and surely none was intended. No one can be more sensible than myself of the great pains he must have taken in the disinterment of the roots of Monotropa; I only intended to say that closer investigation is requisite to determine the parasitism of the plant, than he has yet given to the subject. As to the scent of his specimens, I have as little doubt that I should have agreed with him, as I have of the accuracy of my

own perceptions with respect to the Southport plant. All my remarks were written purely with a wish to excite enquiry into facts not yet fully established by evidence. My friend Dr. J. B. Wood last year directed my attention to some very singular remarks on this plant by Monsieur Jaume St. Hilaire, in the 'Plantes de la France,' iii. (1809). At that period he says the plant was so little understood, that it was difficult to ascertain "whether it was a distinct species or a monstrosity of another plant," (si c'est une espèce distinct, ou une monstruosité d'une autre plante); and that it was always found "adhering and parasitical upon the roots of elms &c., but never [afterwards] in the same spot." So that here we have a plant at once migratory and parasitical, properties which would be very astonishing, thus united, in any but a plant of such mysterious origin.—*Id.*

163. *Note on the second British species of Monotropa.* The smooth-petalled form of Monotropa Hypopitys noticed by Mr. Gibson (Phytol. 201) will probably be found in other localities now that attention is directed to it. I have a specimen in my possession from Cholsey, Berks, gathered by Mr. Baber, and distributed by the Botanical Society of London in 1839, which differs from a Reigate specimen of the more usual form, sent to me by the same Society, and agrees with the characters given by Mr. Gibson. The plant or variety has, however, been recognized before by various foreign botanists, and appears to be the same as the Hypopitys hypophegea of G. Don, 'General System of Gardening,' iii. 866. It is the H. glabra of Decandolle (Prodr. vii. 780), who gives as its habitat the roots of beech-trees in various parts of Germany, and suggests that it may be also found in France and England. A smooth form of Monotropa Hypopitys is also mentioned by Koch, in his 'Syn. Flor. Germ. et Helv.' where it is considered as being merely a variety, between which and the hairy form this author finds many intermediate states.—*Robert J. N. Streeten; Worcester, 9th May,* 1842.

164. *Trifolium incarnatum*, (Phytol, 198). The only localities in which I have met with Trifolium incarnatum are Snelsmore and Greenham Commons, near Newbury, Berkshire; where, in 1838, it grew on the turf, not far from the road-side, in many parts of the commons, and by an inexperienced botanist, who was not aware of the plant's being cultivated in the neighbourhood, would certainly have been supposed to be wild; indeed, I confess, that when I first saw its deep red flowers, I hoped that I had found a prize. It grew in a scattered manner, and was always very starved and stunted in its growth.—*Anna Worsley; Brislington, May* 10, 1842.

165. *Potamogeton prælongus.* In the 'Northern Flora' by Dr. Alexander Murray, of Aberdeen, published in 1836, occur the following remarks respecting this plant.—It "is one of the most recent additions to the British Flora. It is said, however, that there are specimens of it in the herbarium of Mr. Brodie of Brodie,* 20 or 30 years old; and it is certain that the writer of these remarks, though then unable to determine the name, gathered this species in Cromar, Aberdeenshire, several years before it was known to be a native of Britain, and showed the specimen, still in his possession, upon the same day, as something remarkable, to his friend Mr. John Anderson, now editor of a London daily paper." The readers of 'The Phytologist' are of course aware that since the time at which these words were written, various localities, both in Eng-

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* Lochlee is on the Brodie property; but few of the specimens in the Brodie herbarium were gathered within the province of Moray.

land and Scotland, have been discovered for the interesting plant to which they refer. But they are not, perhaps, aware by whose means or in what manner it was first made known that Potamogeton prælongus had been found in this country. In the summer of 1832, I found this plant first in the moss of Litie, and soon afterwards in Locblee, both stations within the county of Nairn. After examining it over and over, and comparing it with the descriptions given in Hooker's 'British Flora,' I could not identify it with any species there described. I at last showed a specimen to my friend, Mr. William A. Stables, of Cawdor Castle, who had not previously seen it, and could not name it. Ever more ready to promote a friend's fame than his own, Mr. Stables in 1833, sent some specimens to Dr. Walker Arnott, who pronounced the plant to be Potamogeton prælongus (adding several synonymes), and "new to the British Flora." It is highly probable that it had been, in several instances, mistaken for another species before the time to which I have alluded, but certainly it was not known by any distinct name as a native of Britain until, through the communication of Mr. Stables, it was named by Dr. Arnott. I forget whether it was before or after he knew its name that Mr. S. found the plant growing in Lochindorb. With reference to what I have now written, I may just remark, that I have no wish to depreciate the botanical services of others in order to extol my own, or to take away from the merit — if merit there be — of the mere discovery of a plant previously unknown. But I think that those who do actually make discoveries, knowing or suspecting them to be so, certainly do very little for the cause of botanical science by neglecting to communicate them. And in my honest opinion my excellent friend already named has, with respect to the plant in question, more merit than any who have had a hand in adding it to the British Flora. The description of P. prælongus is now so well known, and has been so recently inserted in your pages, (Phytol. 28), that it need not be here repeated. There is, however, one peculiarity in the leaves, which I think has not been quite correctly described by our British botanists. By some they are said to be "obtuse," by others "hooded" at the point; and by others, I think, they are not, in that particular, described at all. I would describe them as terminating in what resembles the *bow* of a boat, and I think the "foliis apice navicularibus" of the continental botanists — for which expression I am also indebted to Mr. Stables—forms the best possible description of them. When dried and flattened they are of course split at the point. The lamented author of 'The Northern Flora,' who did live to finish what would have formed the most interesting of all our local Floras, assigns, on the authority of Francis Adams, Esq., Surgeon, Banchory, the *feminine* gender to the word Potamogeton. In an appendix to Dr. Murray's work, Mr. Adams has furnished 'Notes from the Ancients on certain indigenous species;' and among other things remarks—"Modern botanists have fallen into strange mistakes about the gender of this word. Thus Sprengel, in his 'History of Botany,' makes it masculine; and Hooker, in his 'Flora Scotica,' makes it neuter Now it so happens that the word is unquestionably feminine in Latin, as is proved from the following passage in the N. H. of Pliny:—"Potamogeton adversatur et crocodilis: itaque secum habent *eam* qui venantur. Castor *hanc* aliter noverat &c." Dr. Murray adds in a note, that "general principles, as well as the authority of Pliny, may be said to be in favour of Potamogeton being a feminine word." — *J. B. Brichan; Manse of Banchory, by Abderdeen, May* 16, 1842.

166. *Enquiry respecting Pyrola media.* As it is very important that published lists of plants should be correct, and I feel especially desirous that 'The Phytologist' should become an authority on this point, allow me, through your medium, to ask Mr. Buck-

ley if he is quite sure he gathered at Lytham in July last, Pyrola media, which he includes in his list of Lytham plants, (Phytol. 165). I ask this because whilst I gathered Pyrola rotundifolia in that locality in July, 1834, and have since received it from the same place, I have never seen, nor before heard of, Pyrola media growing there. Pyrola rotundifolia is also abundant at Southport, on the opposite shore of the Ribble, in similar situations.—*Samuel Simpson ; Lancaster, May* 17, 1842.

167. *Chrysosplenium alternifolium.* I may mention that Chrysosplenium alternifolium grows along the banks of a narrow rivulet in the immediate neighbourhood of this town, in very great abundance and luxuriance, forming in some parts large patches, and entirely eclipsing its more humble, and there, less abundant sister — Chrysosplenium oppositifolium.—*Id.*

168. *Note on the Oxlips from Bardfield.* I have, by the kindness of Mr. H. Doubleday, been furnished with specimens of the oxlip (Primula elatior) from Bardfield, (Phytol. 204), which I believe to be quite distinct from the plant usually called by that name. The leaf is very differently formed, the tube of the corolla much longer, the flowers *always drooping*, and the general appearance of the plant is altogether different.—*Joseph Sidebotham ; 26, York St., Manchester, May* 20, 1842.

169. *The valuable Botanical Museum of the late Aylmer Bourke Lambert, Esq.* is advertized for sale by Mr. S. Leigh Sotheby. This collection has been in course of formation for more than half a century. It comprises about one hundred separate and distinct herbaria; the largest carpological collection perhaps ever made by a private botanist, the fruits are dry or preserved in spirits and acids; and a collection of woods and sections of barks, &c. The sale will take place at Mr. Lambert's late residence, 26, lower Grosvenor St.; it will commence on the 27th of June, and will continue for three days.

170. *Erratum.* Phytol. 194, under Bonnemaisonia asparagoides and Polysiphonia cristata, for *Mr. Carnow* read *Mr. Curnow.*

ART. LXX.—*Proceedings of Societies.*

LINNEAN SOCIETY.

April 19, 1842.— Edward Forster, Esq., V.P., in the chair. A bequest of £100. from the late Archibald Menzies, Esq., was announced. Joseph Janson, Esq., exhibited specimens of *Primula scotica*, gathered at Wick, near Caithness.

May 4.—The Bishop of Norwich, President, in the chair. The Rev. C. A. Johns exhibited a living specimen of *Jungermannia reptans*, in fruit; as well as dried specimens of many other species of the same family. The Duke of Northumberland sent for exhibition the ripe fruit, and a female plant in flower, of *Diospyros edulis*, which had grown in His Grace's conservatory at Sion. Read, the continuation of Dr. Hamilton's Commentary on the Hortus malabaricus.

BOTANICAL SOCIETY OF EDINBURGH.

Thursday, May 12, 1842.—Professor Christison in the chair. Miss Jane Farquharson was elected a life member of the Society. Donations to the library and museum were announced from the President, Rev. Mr. Hincks, Mr. Ward, Mr. Isaac Brown, Mr. Joseph Dickson, Mr. Sowerby, Mr. Stricker and Mr. Watson.

The following communications were read :—

1. *On Fumaria parviflora, as a native of England:* by Mr. C. C. Babington, M.A. F.L.S., &c., Cambridge. Mr. Babington, in reference to an opinion formerly expressed by him, that this species was a very doubtful native of England, not having then seen any specimens agreeing with the true characters of it, now states that he has obtained satisfactory proofs of its being a native, but that most botanists have been in the habit of calling *F. Vaillantii* by that name. He says, however, that the flowers of English specimens of *F. Vaillantii* are decidedly smaller than those of some which he possesses from Montpelier, and that in some white-flowered English specimens of the same plant, he perceives traces of an apiculus;—also that in French specimens of *F. parviflora* the flowers are of the same size as those of *F. Vaillantii*, but the fruit has an apiculus. Mr. Babington then proceeds to give a minute description of the principal characters which distinguish this and other allied species of the genus, and among which there has hitherto been much confusion.

2. *On the occurrence of Gelidium rostratum*, Harv., *at Aberdeen:* by Mr. George Dickie, Lecturer on Botany, Aberdeen.* This remarkable plant, which Mr. Turner was disposed to consider, though with some hesitation, as merely a variety of *Delesseria alata*, but which Dr. Arnott and Mrs. Griffiths refer to *Gelidium*, Mr. Dickie states to be abundant at Aberdeen, though it has not hitherto been found *in situ*. It occurs on the large stems of *Laminaria digitata*, and appears to be an inhabitant of deep water —being only found cast up after storms. Mr. Dickie says,—"after comparing numerous fresh specimens of *G. rostratum* and *D. alata*, I feel convinced that there is no essential difference in the structure and outward form of the fruit in these plants. In both the ternate granules are terminal and axillary, and the capsules occupy the same position. The seeds, however, differ in form; those of *D. alata* are mostly oval, in the other they are spherical."

3. *On some anomalies in form in Scolopendrium vulgare:* by Mr. Joseph Dickson. The fronds exhibited by Mr. Dickson presented every possible variety of shape, from lanceolate to reniform, and from entire to lobed or rather digitate. The more usual form is certainly entire and *oblongo-lanceolate*, and it is difficult to account for the freaks of form which not unfrequently occur in this species of fern.

After these papers were read Professor Graham exhibited some very beautiful and interesting specimens of exotics from his own green-house.—*The Edinburgh Evening Post and Scottish Standard, Saturday, May* 21, 1842.

BOTANICAL SOCIETY OF LONDON.

April 18, 1842.—Dr. W. H. Willshire in the chair. Various donations to the library and herbarium were announced and members elected.

Mr. Edward Doubleday exhibited a *Primula* found at Bardfield, Essex; and stated that some few years ago his brother, Mr. Henry Doubleday, observed that the oxlips growing near Bardfield, in Essex, were strikingly different from those found in the vicinity of Epping, where the oxlip is not common; and that further observation had induced him to believe that the Bardfield plant was a distinct species, an opinion in which he (Mr. E. D.) was disposed to concur. Mr. Doubleday next referred to an article in the 'Gardeners' Chronicle,' since republished in 'The Phytologist,' (Phytol. 204), and pointed out the resemblance of the Bardfield plant to the one there alluded to. He expressed his opinion very decidedly that there were in England three distinct species of *Primula*, known by the names of primrose, cowslip or pagel, and oxlip, but that the oxlip commonly so called is nothing more than a hybrid between the primrose and cowslip. This hybrid is extensively distributed over the country, especially in localities where the primrose and cowslip abound: it constantly exhibits a tendency to revert to the primrose by throwing up single flowers of precisely the primrose character, as well as others possessing characters of its other parent the oxlip.

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* See note by Mrs. Griffiths, Phytol. 203.

As a natural consequence such a hybrid would reproduce at times both the parent species, a fact Mr. Doubleday believes to be fully proved.

The Bardfield plant, which Mr. Doubleday considers the true oxlip, differs from the hybrid in the form of the calyx, in its drooping umbel, and in its leaves dying off in autumn: he has examined thousands of plants at and near Bardfield, and never observed a single instance of a solitary flower being thrown up as in the hybrid. The primrose does not occur for some miles round Bardfield, though the cowslip is abundant; therefore hybridization cannot well take place in that locality. The plant under cultivation does not change its character. Should it prove a distinct species Mr. Doubleday claimed for his brother the credit of first detecting the distinction.

May 6.—J. E. Gray, Esq., F.R.S. &c. President, in the chair. The following specimens were exhibited:—*Dicranum spurium*, Hedw., collected in Stockton forest, near York, in March last, by Mr. Spruce, presented by him. *Leskea pulvinata*, Wahl., collected on willows by the Ouse near York, by the same gentleman, and presented by him. *Desmidium Swartzii* and *D. mucosum*, collected near Penzance in December last, by Mr. Ralfs, and presented by him. The following were presented by Mr. Wm. Gourlie, jun.—*Jungermannia stellulifera*, Taylor, collected at Crich, Derbyshire, by Mr. W. Wilson; *Gymnostomum Hornschuchianum*, Arnott, collected at Cromaglown, in July, 1840, and first discovered by Dr. Taylor; *Jungermannia voluta*, Taylor, found at Gortagonee in March, 1841, by Dr. Taylor. Mr. J. G. Lyon presented specimens of *Jungermannia Lyoni*, Taylor, collected at Dunoon, Argyleshire. Mr. T. Sansom exhibited specimens of the following mosses collected by the Rev. C. A. Johns, F.L.S.:—*Bryum Tozeri*, Grev., collected at Swanscombe, Kent;* *Hypnum catenulatum*, Schwæg. from Betsham, Kent; *Tetraphis pellucida*, Hedw., Abbey Wood, Erith, Kent. British plants had been received from Dr. Francis Douglas, Dr. Spencer Thomson, the Rev. W. S. Hore, Mr. W. Wilson, Mr. M. Moggridge, and Mr. Fordham; and donations to the library were announced from Dr. Willshire, Mr. H. O. Stephens and Mr. Adam White.

Dr. Spencer Thomson communicated a paper "On the Anatomy and Physiology of the Seed of *Phaseolus vulgaris*." The paper was accompanied with drawings.—*G. E. D.*

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* See note by the Rev. Mr. Johns, Phytol. 200.

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